**NATURAL RESOURCES CONSERVATION SERVICE**

**CONSERVATION PRACTICE STANDARD**

# FORAGE HARVEST MANAGEMENT

**(Acre)**

**CODE 511**

## DEFINITION

The timely cutting and removal of forages from the field as hay, green-chop, or ensilage.

## PURPOSE

- Optimize yield and quality of forage at the desired levels.
- Promote vigorous plant re-growth.
- Maintain stand life.
- Manage for the desired species composition.
- Use forage plant biomass as a soil nutrient uptake tool.
- Control insects, diseases, and weeds.
- Maintain and/or improve wildlife habitat.

## CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses where machine harvested forage crops are grown.

## CRITERIA

### General Criteria Applicable to All Purposes

Forage will be harvested at a frequency and height that will maintain a desired healthy plant community. See Table 1 for forage harvest recommendations based on stage of maturity, moisture content, length of cut, stubble height, and harvest interval should be used to meet the following criteria.

**Stage of Maturity.** Harvest forage at the stage of maturity that provides the desired quality and quantity.

Delay harvest if prolonged or heavy precipitation is forecast that would seriously damage cut forage.

**Moisture Content.** Harvest silage/haylage crops within the optimum moisture range for the type of storage structure(s) being utilized. (See Table 1.)

- Treat direct cut hay crop silage (moisture content > 70 percent) with chemical preservatives or add dry feed stuffs to avoid fermentation and seepage losses of digestible dry matter.

- For optimal dry hay quality, rake hay at 30 to 40 percent moisture and ted or invert swaths when moisture is above 40 percent.

- Bale field cured hay at 15-20 percent moisture and bale force air-dried hay and 20-35 percent moisture.

**Length of Cut.** When harvested for ensilage, forage will be chopped to a size appropriate for type of storage structure (high moisture wrapped or tubed bales) that allows adequate packing to produce the anaerobic conditions necessary to ensure the proper ensiling process.

**Contaminants.** Forage shall not contain contaminants that can cause illness or death to the animal being fed or rejection of the offered forage.

**Additional Criteria to Improve or Maintain Stand Life, Plant Vigor, and Forage Species Mix**

**Stage of Maturity and Harvest Interval.** Cut forage plants at a stage of maturity or harvest interval range that will provide adequate food reserves and/or basal or auxiliary tillers or buds for regrowth and/or reproduction to occur without loss of plant vigor (See Table 1).

Cut reseeding annuals at a stage of maturity and frequency that ensures the production of viable seed or ample carryover of hard seed to maintain desired stand density.

If plants show signs of short-term environmental stress, management will be applied in a manner that encourages the continued health and vigor of the stand.

**Stubble Height.** Cut forage plants at a height that will promote the vigor and health of the desired species. Cutting heights will provide adequate residual leaf area; adequate numbers of terminal, basal or auxiliary tillers or buds; insulation from extreme heat or cold; and/or unsevered stem bases that store food reserves needed for full, vigorous recovery (See Table 1).

Manipulate timing and cutting heights of harvest to ensure germination and establishment of reseeding or seeded annuals.

**Additional Criteria for Use as a Nutrient Uptake Tool**

Employ a harvest regime that utilizes the maximum amount of available or targeted nutrients.

**Additional Criteria to Control Disease, Insect, Weed and Invasive Plant Infestations**

Schedule harvest periods to control disease, insect, and weed infestations. When a pesticide is used to control disease, insects or weeds, adhere to the specified days to harvest period stated on the pesticide label. Evaluate pest management options by planning conservation practice standard Pest Management (595).

Lessen incidence of disease, insect damage, and weed infestation by managing for desirable plant vigor. Plan and schedule removal of invasive plants.

**Additional Criteria to Improve Wildlife Habitat Values**

If client objectives include providing suitable habitat for desired wildlife

specie(s), then appropriate harvest schedule(s), cover patterns, and plant height to provide suitable habitat for the desired specie(s) should be maintained.

**CONSIDERATIONS**

Where applicable, coordinate this practice with the current NRCS practice standard for Prescribed Grazing (528).

When nutrients or other soil amendments are applied, coordinate this practice with the current NRCS conservation practice standard for Nutrient Management (590) or Waste Utilization (633), as appropriate. An excess or improper balance of nutrients such as nitrogen can produce plant material that causes toxicity in some animals.

Maintain fertility level of hay land so that adequate soil protection and the desired level of production are provided. Use soil test information for determining the lime and fertilizer needs.

For cool season grass apply recommended amounts of phosphate and potash in one application when applying a nitrogen application. Applying a high rate of potash in one application or over-applying potash can lead to an imbalance with magnesium causing a higher incidence of grass tetany.

To control forage plant diseases, insects, and movement of weeds, clean harvesting equipment after harvest and before storing. Cut forages after dew, rain, or irrigation water on leaves has evaporated.

Care should be taken to produce stored forages of the quality needed for optimum performance of the animal being fed. For instance, immature legume forages can be too low in fiber and lead to metabolic disorders in ruminants and an economic loss to the producer due to lowered animal performance.

Direct cut grass and legume silage can create silage leachate (seepage). Consider the collection, storage, and disposal of this leachate as part of an agricultural waste management system.

In conjunction with harvest options, explore storage and feeding options that will retain acceptable forage quality and minimize digestible dry matter loss. Also consider storage location for large square or round bales/balage with regards to inside vs. outside, along hedgerows, winter/mud considerations, etc.

If hay is stored outside, place rolls in a North-South direction with rolls running up and down hill with 3’ or more between lines of rolls. Store rolls on 2” stone, pallets, or other material, and cover if rolls are stacked.

Where weather conditions make it difficult to harvest the desired quality of forage, use mechanical or chemical conditioners and/or ensile.

Where rainfall and/or humidity levels cause unacceptable forage quality losses, consider green chopping or ensiling the forage to reduce or eliminate field drying time. Other options are the use of desiccants, preservatives, conditioners, macerating implements, or barn-curing techniques to reduce field-drying time. These techniques can improve the timeliness of harvest and preserve forage quality.

To reduce safety hazards, avoid operating harvesting and hauling equipment on field

slopes over 25 percent, particularly on cross slope traffic patterns.

Hay cut in the afternoon is slightly higher quality than forage cut in the morning.

Do not allow sericea lespedeza to over-cure. Rake prior to excessive drying to prevent excessive loss of leaves.

Sericea or native grasses should generally not be cut between September 1 and the first killing frost (usually 28$^{o}$) or November 1, whichever occurs first.

Allow alfalfa ample time between the last cutting and first killing frost. Do not cut between September 15 and first killing frost or November 1, whichever occurs first.

To improve reseeding of annuals, leave strips 0.5' wide standing between mowed strips.

**PLANS AND SPECIFICATIONS**

Place the detailed specifications in a site-specific job or design sheet or in the practice narrative in the conservation plan.

These plans and specifications shall be consistent with this standard and shall describe the requirement for applying the practice to achieve its intended purpose.

**OPERATION AND MAINTENANCE**

Before forage harvest, clear fields of debris that could damage machinery or if ingested by livestock, lead to sickness (for example, hardware disease) or death.

Operate all forage harvesting equipment at the optimum settings and speeds to minimize loss of leaves.

Set shear-plate on forage chopper to the proper theoretical cut for the crop being 0harvested. Keep knives well sharpened. Do not use re-cutters or screens unless forage moisture levels fall below recommended levels for optimum chopping action.

Regardless of silage/haylage storage method, ensure good compaction and an airtight seal to exclude oxygen and mold formation.

**REFERENCES**

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**Table 1 – HARVESTING**

| Species | Period | When to Harvest for Maximum Yield and Quality | Minimum Cutting Height (Inches) |
|---|---|---|---|
| **LEGUMES:** | | | |
| Alfalfa | First Cutting<br>Second Cutting<br>Third Cutting | When in Full Bud<br>1/10 Bloom<br>1/10 Bloom (Allow 4-5 weeks of growth prior to the historic first freeze.) | 3-4 |
| Clovers, Red and Alsike<br>Birdsfoot Trefoil | First Cutting<br>Second Cutting | ¼ to ½ Bloom<br>Early Bloom | 3-4<br>3-4 |
| Crimson | Only Cutting | Early Bloom | |
| Sericea Lespedeza | First Cutting<br>Second Cutting | When 10 to 12” High<br>Same as First (Allow 6-7 weeks of growth prior to the historic first freeze.) | 3-4<br>3-4 |
| Annual Lespedeza | Only Cutting | Early Bloom or Before Leaves Begin to Shatter | 2-3 |
| Grass-Legume Mixtures | | When Legume is at Stage of Growth Stated Above or at Height Favorable to Other Desired Species | 3 |
| **GRASSES:** | | | |
| Bermudagrass | All Cuttings | When Plants are 10-15” Tall or Before Lower Leaves Turn Brown | 2-3 |
| Fescue, Tall and Orchardgrass | First Cutting<br>Second Cutting | Boot Stage<br>After 8-10” Recovery Growth | 3-4 |
| Matua | First Cutting<br>Subsequent Cuttings | Boot Stage<br>Allow Matua to Produce Mature Seed One Time During Grazing Season (Usually 45 Days) | 3-4<br>3-4 |
| Timothy | First Cutting<br>Second Cutting | Boot to Early<br>When Basal Shoots Appear at Soil Surface | 3-4<br>3-4 |
| Reed Canarygrass | First Cutting<br>Subsequent Cuttings | Boot Stage<br>After 8-10” Recovery Growth | 6-8<br>6-8 |

**Table 1 – HARVESTING CONTINUED**

| Species | Period | When to Harvest for Maximum Yield and Quality | Minimum Cutting Height (Inches) |
|---|---|---|---|
| Johnsongrass | First Cutting<br>Second Cutting | Boot Stage<br>When Grass is 36" Tall [Leave a higher stubble height (12") when last harvest is made. Allow 6-7 weeks of regrowth prior to the historic first freeze.] | 6-8<br>6-8 |
| Native Grasses | First Cutting<br><br>Subsequent Cuttings | Early Boot Stage (Before Seed Head Appears)<br>When Grass is 36" Tall [Leave a higher stubble height (12") when last harvest is made. Allow 6-7 weeks of growth prior to the historic first freeze.] | 6-8<br><br>6-8 |
| Pearl Millet | All Cuttings | When Grass is 36" Tall | 6-8 |
| Sorghum Sudangrass | All Cuttings | When Grass is 36" Tall | 6-8 |
| Small Grains | First Cutting | Late Boot Stage | 3-4 |
| Ryegrass | First Cutting | Late Boot Stage | 3-4 |